# 250E/260E Series

## Broadcast Quality
## Video/Audio/Data
## Transport System

BCI reserves the right to make changes to the products described herein without prior notice or consent. No liability is assumed as a result of their use or application. All rights reserved.

©2001 Broadata Communications, Inc.

BROADATA COMMUNICATIONS, INC.

# SAFETY INSTRUCTIONS AND COMPLIANCE DECLARATIONS

PLEASE OBSERVE THE FOLLOWING SAFETY PRECAUTIONS AS OUR PRODUCTS CONTAIN

**CLASS I LASER PRODUCTS**

## WARNING

Do not disconnect the fiber optic connector while the unit is powered up. Exposure to laser radiation is possible when the laser fiber optic connector is disconnected while the unit is powered up.

Although the fiber optic connectors in this product emit only Class 1 energy that is below the levels considered to be hazardous, one should never stare directly into a fiber optic connector or an unconnected fiber end unless one can be certain that no exposure to laser energy could occur.

**CAUTION**

This manual is intended for use by trained service personnel. The use of controls, making adjustments, or performing operations other than those specified may result in hazardous radiation exposure.

The following label or equivalent is located on the surface of laser products. This label indicates that the product is classified as a CLASS 1 LASER PRODUCT.

## SURGE PROTECTION DEVICE RECOMMENDED

This product contains sensitive electrical components that may be damaged by electrical spikes, surges, electric shock, lightning strikes, etc. Use of surge protection systems is highly recommended in order to protect and extend the life of your equipment.

# TABLE OF CONTENTS

**1.0 PRODUCT DESCRIPTION ..... 5**
**2.0 SETUP ..... 7**
**2.1 MOUNTING ..... 8**
**2.2 CABLING AND CONNECTORS ..... 8**
**2.2.1 ELECTRICAL CABLE CONNECTION ..... 8**
**2.2.1.1 VIDEO INTERFACE ..... 8**
**2.2.1.2 AUDIO INTERFACE ..... 9**
**2.2.1.3 SERIAL DATA INTERFACE ..... 11**
**2.2.2 OPTICAL FIBER CONNECTION ..... 14**
**2.4 AC POWER CONNECTION ..... 16**
**3.0 OPERATION ..... 16**
**4.0 MAINTENANCE AND TROUBLESHOOTING ..... 17**
**4.1 MAINTENANCE ..... 17**
**4.2 TROUBLESHOOTING ..... 18**
**5.0 SPECIFICATIONS ..... 20**
**6.0 SERVICE PROCEDURE ..... 22**
**6.1 REPLACEMENT POLICY ..... 22**
**6.2 RETURN AND REPAIR SERVICE ..... 22**
**7.0 LIMITED WARRANTY ..... 23**

# 1.0 PRODUCT DESCRIPTION

The BCI 250E/260E Series is a high performance unidirectional/ bi-directional transmission system capable of carrying simultaneous broadcast quality analog video, audio, and/or data signals. The standard single channel models (250E/260E) will transport one channel of broadcast quality analog video, two audio channels, and/or one serial data channel (RS-232/RS-422) over multimode or singlemode fiber. The 250E/260E has a loop-though video monitoring port in the TX unit and has two output video ports in the RX units. The video quality in the 250E/260E system meets 250C short haul specifications, while its audio specifications exceed professional standards. Many versions of optical transmitters and receivers can be used in the 250E/260E to address a different distance coverage.

The 250E/260E features a digital fiber optic transmission technology, capable of providing sharper video and crisp audio, high functional reliability, and low operating cost with little or no maintenance. The quality of the video, audio and data transmission is superior to the analog transmission systems (based on the counterparts amplitude or frequency modulation) schemes. No user adjustments are required in the 250E/260E system, enabling for a quick setup with trouble-free operation.

The 250E/260E comes in two packaging options: a rugged standalone unit, or a plug-in card for a card cage system. Panel connectors are provided for video (BNC), audio (terminal block), and data (terminal block), and fiber connection (FC-type for singlemode fiber or ST-type for multimode fiber). They are also easily monitored by separate LED indicators for power, optical link, and channel activity. See Figure 1-1 for the front and rear panels of a 250E.

Due to its digital transmission design, the 250E/260E is capable of addressing a variety of non-standard configurations.

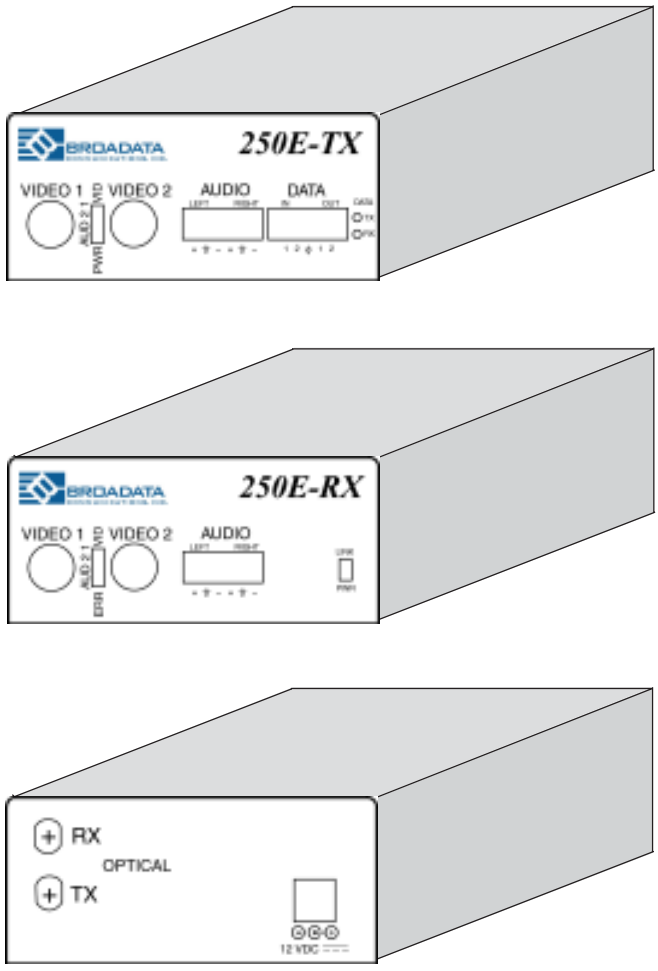



**Figure 1-1**
**250E Front/Rear Panels**

## 2.0 SETUP

The BCI 250E/260E Series units are used in pairs. For unidirectional applications, the 250E transmitter is located at the near-end, while a 250E receiver is connected at the far-end through one fiber. For bi-directional applications, one 260E transceiver unit is located at the near-end and connected through two optical fibers to an identical 260E transceiver located at the far-end of the link. Each unit provides a separate electrical interface connector for the audio, video, and data signals. Connections are one to one between both units. Figure 2-1 depicts a typical installation.

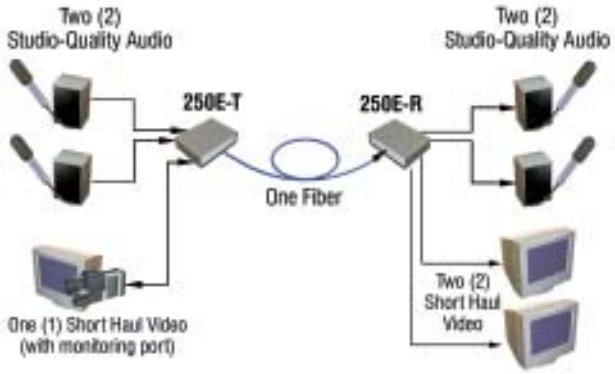



**Figure 2-1**
**250E Setup**

## 2.1 Mounting

Before installing the units into your housing, make sure there is enough space to pull and connect both the electrical and optical cables without stressing them beyond the manufacturer's limitations (also known as the bend radius minimum). Rack Mount kits are available through special order.

## 2.2 Cabling and Connectors

In order to setup the BCI 250E/260E properly, make sure to observe the following instructions when installing the proper cables. The 250E/260E requires two parts to the cabling setup: the electrical and the optical. For the optical part, observe the following procedures, as there are various types of optical connectors as illustrated on the following page.

### 2.2.1 Electrical Cable Connection

On the electrical side, it is required that the following steps be observed when connecting the various audio, video, and data terminal devices as they all require special attention, and are the only available electrical connections. They are described in the following steps.

#### 2.2.1.1 Video Interface

The 250E/260E accepts 75-ohm video signal over coaxial cable terminated to a BNC connector (e.g., RG 59U with a BNC connector). (See Figure 2-2). For analog video connections, observe the following instructions.

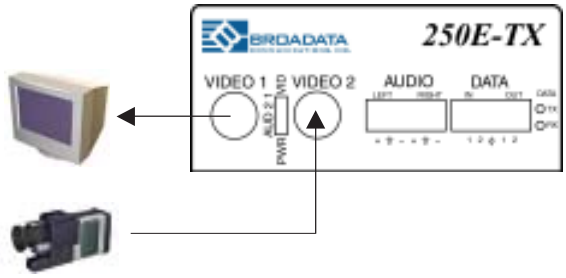



**Figure 2-2**
**Video Connection**

1. Connect the required video transmission source to the VIDEO 2 BNC connector on the 250E/260E unit.
2. Lastly, connect the VIDEO 1 BNC connector on the 250E/260E unit to the required video receiver unit(s). You are now ready to transmit and receive video signals.

### 2.2.1.2 Audio Interface

For the audio portion, observe the following steps. (See Figure 2-3).

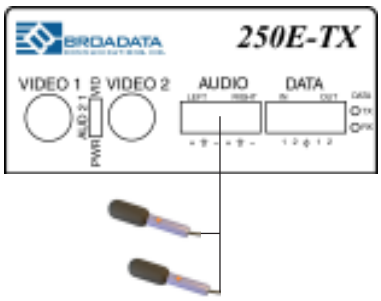



**Figure 2-3**
**Audio Connection**

1. Connect the user's audio transmission source(s) to the 250E/260E transmitter unit's audio input ports. Observe the proper polarity when connecting your audio sources.

    a. **For balanced audio signal**, connect the positive (+), negative (-) and ground (G) of the 250E/260E unit's terminal block to corresponding terminals of user's equipment.

    b. **For unbalanced audio signal,** connect the negative (-) and ground (G) of the 250E/260E unit's terminal block.

    Connect the positive (+) terminal of the 250E/260E unit to the positive (+) terminal of the user's equipment and negative (-) or ground (G) of the 250E/260E unit to the ground terminal of the user's equipment.

2. Lastly, connect the 250E/260E unit's audio output ports to the required audio receiver devices. You are now ready to transmit and receive audio signals.

When connecting the audio sources, be sure to observe the following for proper polarity.

Three position terminal blocks (feed-through) are provided for the three-wire audio connection (see Figure 2-4). We recommend you use 22 standard wire (22-AWG) to connect the user's audio equipment to the 250E/260E unit. Use a flat head screwdriver to tighten the terminal screw.

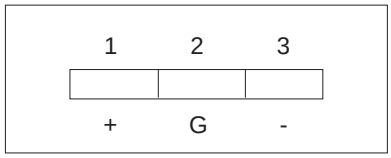



**Figure 2-4**
**Three Position Terminal Block**

### 2.2.1.3 Serial Data Interface (260E Model Only)

Each 260E unit is equipped with either an RS-232 or an RS-422 interface, which is preset at the factory. Follow the proceeding instructions depending on what data type you have installed.

**RS 232 Unbalanced Data**
The 260E units transport unbalanced data signals with handshaking control, and are compatible with Full Duplex RS-232 (C, D, and E) type devices. Use the following steps for connecting data transmission equipment:

1. Connect your serial data cable to the user's RS-232 device. (See Figure 2-5).
2. Connect the other end of this cable to the front panel RS-232 female terminal block connector of the 260E TX unit.
3. Repeat step 1 and 2 for the 260E RX unit.

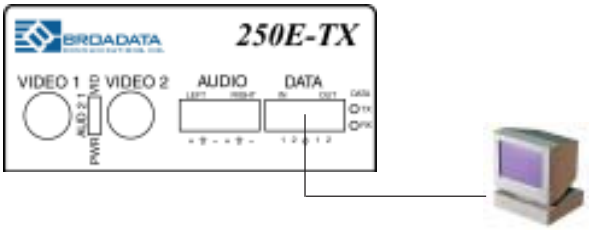



**Figure 2-5**
**Data Connection**

Figure 2-6 (a) shows pin connections between the 260E Series unit (as a DCE unit) and the user's RS-232 device (as a DTE unit). Typically only IN 1 and OUT 1 are used for RS-232 data transmit and receiving. IN 2 and OUT 2 can be used as a second data port for handshade control.

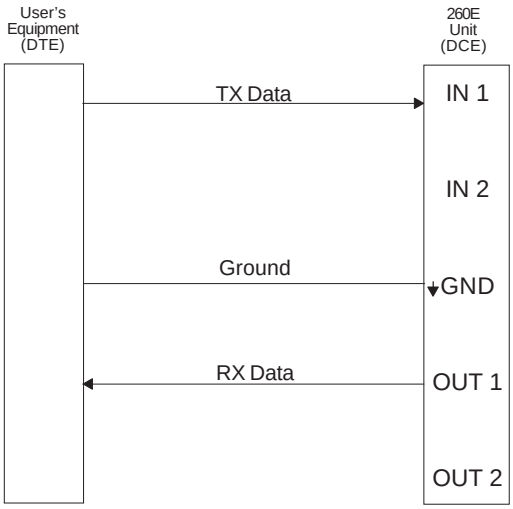



**Figure 2-6 (a)**
**Pin Connections Between 250E Series Unit and User's RS-232 Device**

**RS 422 Differential Serial Data**

The 260E units transport differential data signals with compatible Full Duplex RS-422 type devices. Note that RS-422 does not support handshaking control signals. Use the following steps when connecting data transmission equipment:

1. Connect your serial data cable to the user's RS-422 device. (See Figure 2-5).
2. Connect the other end of this cable to the front panel RS-422 female terminal block connector of the 260E TX unit.
3. Repeat step 1 and 2 for the 260E RX unit.

Figure 2-6 (b) shows pin connections between the 260E Series unit (as a DCE unit) and the user's RS-422 device (as a DTE unit).

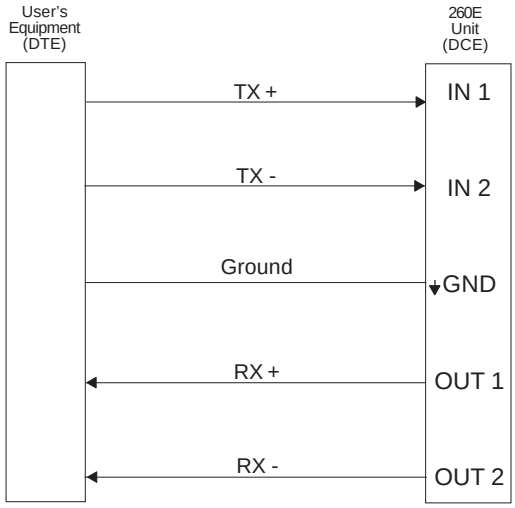



**Figure 2-6 (b)**
**Pin Connections Between 260E Series Unit and User's RS-422 Device**

### 2.2.2 Optical Fiber Connection

Most cable manufacturers identify individual fibers in the fiber cable. Select an appropriate terminated fiber. Each unit's optical ports in the system are specified for use with Multimode (62.5/125 micron) fiber, or Singlemode (9/125 micron) fiber. Follow the ensuing instructions for installing and connecting the fiber optic links:

1. Ensure the power is off before proceeding with the fiber optic cable installation.
2. Prior to connecting the fiber optic cables, remove and save the dust caps from the optical port of both the 250E/260E units and the user's device. Clean the fiber optic connector and use a lint-free cloth dampened with alcohol to thoroughly wipe the side and end of the ferrule. Table 1 shows the connection mechanisms for both ST and FC connectors.
3. Cross-connect the fibers from one unit to the other connecting the near end 250E/260E unit's optical TX port to the far end 250E/260E unit's optical RX port as illustrated in Figure 2-7. Observe the type of connector you have and connect the optical connector by following the instructions and guidelines from the legend provided in Table 1.

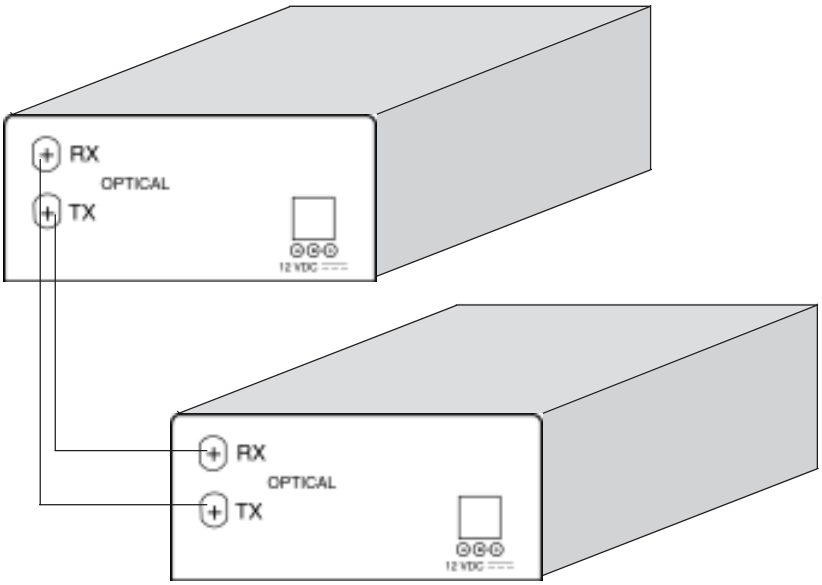



**Figure 2-7**
**Fiber Optic Connection**

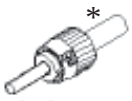
| Connector | Illustration | Description |
|---|---|---|
| ST |  ST Connector | Hold the connector by the strain-relief boot* and insert the connector ferrule into the port. Rotate the boot until the "key" engages in the slot of the coupling. Push the connector housing forward until it can be turned clockwise to latch to the port. |
| FC | FC Connector | Hold the connector by the strain-relief boot* and insert the connector ferrule into the port. Rotate the boot until the "key" engages in the slot of the coupling. Push the connector housing forward and screw clockwise until it is tight. |

**Table 1**
**Fiber Optic Connector Legend**

## 2.4 AC Power Connection

Congratulations! You are now ready to power up the BCI 250E/260E and set up your network connection. In order to make sure that you have a proper installation, please observe the following:

1. Your AC jack has power.
2. Your electrical system has proper grounding (this ensures that your power supply does not suffer from voltage variations).
3. **Power Surge Protection. This is optional**, but highly recommended. A UPS system provides voltage regularity as well as prevents spikes from occurring, thus protecting your 250E/260E from sensitive voltage conditions.

The 250E/260E derives power from an internal power supply. This power supply is a 95-240 VAC, 50-60 Hz, at 0.8A. This power supply comes standard for the 250E/260E unless otherwise specified.

To provide power to the 250E/260E, simply connect the power cord, already provided with the units, and connect it to the wall jack. (You will find one power cord per unit). Once the power cord has been connected to the wall jack, connect the other end of the cord and turn the switch on (I).

If you have any problems or concerns, regarding the installation, make sure that you have taken the proper steps to ensure a proper power connection. Otherwise, feel free to contact us for any questions you may have.

# 3.0 OPERATION

After the installation procedure is completed, the units are ready for operation. To operate the BCI 250E/260E units, simply apply power as indicated in the previous step. Note that the following front panel link status indicator, shown in Table 2(a) and Table 2(b), will be activated.

# 4.0 MAINTENANCE AND TROUBLESHOOTING

## 4.1 Maintenance

There is no operator maintenance other then keeping the units clean. However, observe the following light indicators to make sure that the unit is working properly:

| | |
|---|---|
| **Power (TX Module)** | This RED LED indicates that the transmit module is properly powered. |
| **VID (TX Module)** | This GREEN LED on the transmitter indicates that the unit transmits video to the user's equipment. |
| **AUD 1 (TX Module)** | These GREEN LEDs indicate that the unit is receiving signals from the user's audio equipment. |
| **AUD 2 (TX Module)** | These RED LEDs indicate that the audio signals from the user's audio equipment is saturated. |
| **Data (TX Module)** | These GREEN LEDs indicate that data signals are transmitting from the user's data equipment. |

**Table 2(a)**
**TX Status Indicators**

| | |
|---|---|
| **Power (RX Module)** | This RED LED indicates that the receive module is properly powered. |
| **Link** | This AMBER LED indicates that the optical link is properly established. |
| **VID** | This GREEN LED on the receiver indicates that the unit receives video from the user's equipment. |
| **AUD 1** | These GREEN LED indicate that the unit is transmitting signals to the user's audio equipment. |
| **AUD 2** | These RED LED indicate that the audio signals to the user's audio equipment is saturated. |
| **ERR (TX Module)** | This RED LED indicates that the integrity of optical signal is not good and produces an error. |
| **Data (RX Module)** | These GREEN LEDs indicate that data signals are receiving and being transmitted to the user's data equipment. |

**Table 2(b)**
**RX Status Indicators**

## 4.2 Troubleshooting

If the BCI 250E/260E units do not operate properly after installation, check for possible cable breaks, loose connections, and incorrect cable connections. If a problem exists on the fiber link, please check your fiber connectors for improperly cleaned fiber cables and connectors. If problems persist that may be fiber related, contact BCI at 1-800-214-0222 for further assistance.

For electrical problems, perform the following troubleshooting procedures:

1. **If the POWER indicator is OFF, check for the following:**

   a. The line cord is plugged into the unit and your outlet has power.

   b. The 250E/260E unit is switched on.

2. **If the POWER indicator is ON, but the Optical Link indicator is OFF, check for the following:**

   a. Make sure the appropriate (Singlemode or Multimode) fibers are being used.

   b. Fiber and fiber connectors are not broken. Ensure that the optical loss does not exceed the specified optical power attenuation.

   c. For each unit, the transmit (TX) fiber is connected to the other unit's receiver (RX).

3. **If the POWER indicator and Optical Link indicator are ON, but the audio/video channels are not operating, then:**

   a. Check to see that the attached user equipment is turned on.

   b. Both ends of the link are connected to the corresponding equipment and to the same corresponding channel port.

   c. Cable connections at both the video/audio channels are securely fastened to each connector. Turn the power off, then back on to reset the link.

   d. Output levels of the user's video and audio sources are not above the allowed input levels of the 250E/260E units.

# 5.0 SPECIFICATIONS

**Video**

| | |
|---|---|
| Channel Capacity | 1 |
| Signal Resolution | 12 Bits Digitized |
| Bandwidth | 10MHz |
| Video Level | 1.0Vp-p @ 75 Ohms |
| Differential Gain | <1.0% |
| Differential Phase | <0.50° |
| SNR (Weighted) | >70dB |
| Connector | BNC, 75 Ohms |

**Audio**

| | |
|---|---|
| Channel Capacity | 2 or 4 |
| Operating Mode | Balanced or Unbalanced |
| Signal Resolution | 24 Bits |
| Input/Output Impedance | 600/600 Ohms (Balanced) |
| Max. Input/Output Level | +18dBm @ 600 Ohms (Balanced) |
| Magnitude Freq. Response | 20Hz to 20kHz @ -1 dB |
| THD+N | >85dB @ 1kHz |
| Connector | Terminal Block |

**Serial Data**

| | |
|---|---|
| Channel Capacity | 1 |
| Signal Format | RS-232 or RS-422 |
| Operating Mode | Full Duplex with Handshake |
| Data Rate | Up to 128kbps |
| Connector | Terminal Block |

## Physical

| | |
|---|---|
| Dimension: (H x W x D) | |
| Standalone/external power | 2" x 4.36" x 8.75" |
| Standalone/internal power | 1.72" x 17.03" x 12.0" |
| Card-cage Plug-in Card | 5.24" x 0.94" x 11.6" |
| Power | 12 VDC @ 1.5 A |
| Operating Temperature | 0 to +50°C |
| Humidity | 0 to 95% RH, Non-condensing |
| Status Indicators | Power, Optical Link, Video/Audio/Data Activity |

## Optical

| | |
|---|---|
| Fiber Type | Multimode and Singlemode |
| Number of Fibers | 2 or 1 |
| Wavelength | 850, 1310 and/or 1550 nm |
| Fiber Optic Connector | ST (Multimode)<br>FC (Singlemode) |

**Typical Power Budget and Transmission Distance**

| Application | Power Budget (1) | Typical Distance KM (2) | Typical Distance Miles (2) |
|---|---|---|---|
| Multimode Fiber | 8 | 1 | 0.6 |
| Singlemode Fiber | 14 | 30 | 19 |
| Multimode Long Distance | 12 | 3 | 2 |
| Singlemode Long Distance | 19 | 60 | 37 |

(1) These are typical values for the 250E/260E Series. The actual values may vary.

(2) These are typical distance coverage figures. The maximum distance coverage may be greater than these typical numbers, depending on fiber type, fiber bandwidth, connector splicing losses, chromatic dispersion, environmental factors, etc.

# 6.0 SERVICE PROCEDURE

## 6.1 Replacement Policy

Standard products found defective on arrival (DOA) will be replaced, based on availability. Please call Customer Service at **800-214-0222** for information.

## 6.2 Return/Repair Service

The 250E/260E System contains no user serviceable components. If you have a problem with your unit, please contact the Customer Service Department. To facilitate our return/repair processing please contact Broadata Communications, Inc. to obtain a Return Material Authorization (RMA). Please include the following information:

- Product model number
- Serial Number
- Complete description of problem
- Hardware installation description

Broadata Communications, Inc.
2545 West 237th Street, Suite K
Torrance, CA 90505
**1-800-214-0222**
(310) 530-1416
(310) 530-5958 (Facsimile)
e-mail: CustomerService@Broadatacom.com
Website: www.broadatacom.com

## 7.0 LIMITED WARRANTY

Broadata Communications, Inc. (BCI) warrants, for a period of one year from date of shipment, each product sold shall be free from defects in material and workmanship. BCI will correct, either by repair, or at BCI's election, by replacement, any said products that in our sole discretion prove to be defective and are returned to the manufacturing location within 30 days after such defect is ascertained. All warranties are limited to defects arising under normal use and do not include malfunctions or failure resulting from misuse, abuse, neglect, alterations, electrical power problems, usage not in accordance with product instructions, improper installation, or damage determined by BCI to have been caused by the Buyer or repair made by a third party. Limited warranties granted on products are to the initial customer end-user and are not transferable. OUR LIABILITY UNDER THIS WARRANTY SHALL IN ANY CASE BE LIMITED TO THE INVOICE VALUE OF THE PRODUCT SOLD AND BCI SHALL NOT BE LIABLE TO ANYONE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES ARISING FROM THE USE OF ITS PRODUCTS OR THE SALE THEREOF. We make NO WARRANTY AS TO THE MERCHANTABILITY OF ANY GOODS, OR THAT THEY ARE FIT FOR ANY PARTICULAR PURPOSE OR END APPLICATION NOR DO WE MAKE ANY WARRANTY, EXPRESSED OR IMPLIED OTHER THAN AS STATED ABOVE.

# Notes

# Notes

# Notes

Broadata Communications, Inc.
2545 West 237th Street, Suite K
Torrance, CA 90505
**1-800-214-0222**
(310) 530-1416
(310) 530-5958 (Facsimile)
e-mail: CustomerService@Broadatacom.com
Website: www.broadatacom.com

6000E-0250-$A_1$